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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,556	12/22/2004	Richard Michael Taylor	5035-200US//P29,651 USA	8394

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EXAMINER	
YIGDALL, MICHAEL J	

ART UNIT	PAPER NUMBER
2192	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/518,556	TAYLOR, RICHARD MICHAEL	
	Examiner	Art Unit	
	Michael J. Yigdall	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/14/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-27 are pending. A foreign priority date of June 28, 2002 is considered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

With respect to claim 1 (original), the claim is directed to a method of generating executable code. However, because the claim does not set forth any steps involved in the method, it is unclear what Applicant is intending to encompass. A claim is indefinite where it merely recites a "method" without any active, positive steps delimiting how the method is actually practiced.

With respect to claims 2-26 (original) and 27 (currently amended), the claims are dependent on claim 1 and are therefore indefinite for the same reason(s) as noted above.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

With respect to claim 1 (original), the claim is directed to a method of generating executable code. However, claiming a "method" without setting forth any steps involved in the method results in an improper definition of process under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd. App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). Thus, the claim does not fall within any category of statutory subject matter. Furthermore, as recited, the "method" is not tied to any particular apparatus and does not produce a useful, concrete and tangible result. See MPEP § 2106.

With respect to claims 2-26 (original), the claims do not remedy claim 1 and are therefore directed to non-statutory subject matter for the same reason(s) as noted above.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Jan Hoogerbrugge, "Code Generation for Transport Triggered Architectures" ("Hoogerbrugge").

With respect to claim 1 (original), Hoogerbrugge teaches a method of generating executable code for a configurable microprocessor architecture (see, for example, pages 43-44,

section 3.1, "Overview of the Compiler," which shows generating executable code for a configurable transport-triggered microprocessor architecture) whereby:

there are individual registers in the data paths between execution units (see, for example, pages 26-27, "Figure 2.9 shows the general structure of TTA …," which shows that the architecture includes individual registers in data paths among functional units);

the update of these registers is explicitly managed from the instruction set of the processor (see, for example, pages 4-5, section 1.2, "Transport Triggered Architectures," which shows that the update of the registers is managed from the instruction set); and

the reading and writing of those registers is represented in a data flow graph representation of the program being targeted to the processor (see, for example, page 29, Figure 2.12, which shows a data flow graph that represents the reading and writing of the registers).

With respect to claim 2 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that the number of registers associated with particular execution units is configurable (see, for example, page 48, Figure 3.3).

With respect to claim 3 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that the target architecture is specified in an input file (see, for example, pages 46-47, "The machine description file …").

With respect to claim 4 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that certain units may only be connected to a subset of other execution units in the architecture (see, for example, page 4, Figure 1.2).

With respect to claim 5 (original), the rejection of claim 4 is incorporated, and Hoogerbrugge further teaches that there is a central register file but only a subset of the execution units in the system can directly communicate with it (see, for example, pages 32-34, section 2.3.6, "The Interconnection Network").

With respect to claim 6 (original), the rejection of claim 3 is incorporated, and Hoogerbrugge further teaches that the input program is initially represented as a sequence of operations that can be performed by execution units present in the target architecture (see, for example, page 46, "The back-end starts with reading the sequential program …").

With respect to claim 7 (original), the rejection of claim 6 is incorporated, and Hoogerbrugge further teaches that the inputs to and results from these basic instructions may be communicated via a central register file (see, for example, pages 26-27, "Figure 2.9 shows the general structure of TTA …").

With respect to claim 8 (original), the rejection of claim 7 is incorporated, and Hoogerbrugge further teaches that the code sequence may be optimised to reduce the communication required with the central register file (see, for example, page 115, section 6.2.4, "TTA Specific Optimizations").

With respect to claim 9 (original), the rejection of claim 8 is incorporated, and Hoogerbrugge further teaches that multiple reads of a given register file value may be transformed into a single read with suitable communication of the same data to other consumers of the data value (see, for example, pages 39-40, "Operand sharing").

With respect to claim 10 (original), the rejection of claim 8 is incorporated, and Hoogerbrugge further teaches that pairs of central register file writes and reads may be transformed to use direct communication between the generating and consuming operations (see, for example, page 40, "Socket sharing").

With respect to claim 11 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that the data flow graph is transformed so that data edges correspond to physical connections in the architecture (see, for example, pages 139-141, section 7.1.2, "Connectivity Optimization").

With respect to claim 12 (original), the rejection of claim 11 is incorporated, and Hoogerbrugge further teaches that additional nodes may be inserted into the graph to represent the copying of data values where there is no physical connection corresponding to the graph data flow (see, for example, pages 100-102, section 5.2.3, "Delay Lines").

With respect to claim 13 (original), the rejection of claim 12 is incorporated, and Hoogerbrugge further teaches that the dependencies between reads and writes to registers are represented as edges in the graph (see, for example, pages 19-21, "Data dependences").

With respect to claim 14 (original), the rejection of claim 13 is incorporated, and Hoogerbrugge further teaches that graphs that cannot be scheduling are detected by the presence of cycles in the graph (see, for example, pages 89-90, section 5.1.1, "Cyclic Data Dependency Graphs").

With respect to claim 15 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that an idealised form of the graph is generated that assumes the availability of unrestricted connectivity in the architecture (see, for example, pages 139-141, section 7.1.2, "Connectivity Optimization").

With respect to claim 16 (original), the rejection of claim 15 is incorporated, and Hoogerbrugge further teaches that the idealised form of the graph is used to influence the binding of operations to physical execution units in the architecture (see, for example, pages 139-141, section 7.1.2, "Connectivity Optimization").

With respect to claim 17 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that special edges within the graph represent communication of data via a central register file (see, for example, pages 19-21, "Data dependences").

With respect to claim 18 (original), the rejection of claim 17 is incorporated, and Hoogerbrugge further teaches that operations from different basic blocks may be represented in a single graph (see, for example, pages 69-70, section 4.1, "Scheduling Scopes").

With respect to claim 19 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that individual operations in the graph are bound to particular execution unit instances (see, for example, pages 61-63, section 3.2.3, "Resource Assignment").

With respect to claim 20 (original), the rejection of claim 19 is incorporated, and Hoogerbrugge further teaches that the unit binding uses an estimate of the delay caused by

transporting operands to and results from the operation as a factor in the allocation (see, for example, pages 28-30, section 2.3.2, "An Example").

With respect to claim 21 (original), the rejection of claim 20 is incorporated, and Hoogerbrugge further teaches that the transport cost is dependent on the structure of connectivity between the operations in the graph (see, for example, pages 139-141, section 7.1.2, "Connectivity Optimization").

With respect to claim 22 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that the graph may be updated as new physical paths are added to the architecture in order to reduce the graph height to allow shorter code schedules (see, for example, pages 63-64, section 3.2.4, "Scheduling an Operation").

With respect to claim 23 (original), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches that individual execution units are controlled by particular bits within the overall execution word (see, for example, page 27, Figure 2.10).

With respect to claim 24 (original), the rejection of claim 23 is incorporated, and Hoogerbrugge further teaches that certain bits in the execution word may be used to control more than a single execution unit (see, for example, page 91, "… operations can be performed by multiple FU types …").

With respect to claim 25 (original), the rejection of claim 24 is incorporated, and Hoogerbrugge further teaches that the allocation of bits in the execution word to particular

execution units is optimised as the architecture is generated (see, for example, pages 136-139, section 7.1.1, "Resource Optimization").

With respect to claim 26 (original), the rejection of claim 25 is incorporated, and Hoogerbrugge further teaches that the usage of individual execution units is used to influence the allocation of the execution word (see, for example, pages 134-135, section 7.1, "The Design Process").

With respect to claim 27 (currently amended), the rejection of claim 1 is incorporated, and Hoogerbrugge further teaches a microprocessor configured to execute code that has been generated using the method of claim 1 (see, for example, page 2, section 1.1, "Application Specific Processors," which shows such a microprocessor).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure (see the attached Notice of References Cited).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Yigdall whose telephone number is 571-272-3707. The examiner can normally be reached on Monday to Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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